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# Teachers' role and attitudes concerning ADHD medication: A qualitative analysis

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## Abstract

The increased use of Attention Deficit/Hyperactivity Disorder (ADHD) medication by children has led to growing concerns. In a previous study, we found that many of the teachers that were interviewed about ADHD spontaneously associated ADHD with medication. The present study is a qualitative reanalysis of what precisely these 30 primary school teachers had spontaneously said about medication in our previous semi-structured interviews on ADHD. Almost all respondents had experience with pupils taking ADHD medication. The majority of spontaneously mentions medication as the treatment of ADHD. Attitudes towards ADHD medication use by pupils are mainly ambivalent, but more positive than negative effects of medication are reported. However, what teachers say about ADHD medication is often not based on sound information; their attitudes tend to be formed by personal experiences rather than founded on professional and scientific sources. We conclude from our analysis that it will be in the interest of reducing the number of children on ADHD medication that teachers have good access to verified and up-to-date information on ADHD and medication so that they are better supported in making evidence-based pedagogical judgments.

KEYWORDS
ADHD, medication, teachers

## 1 | INTRODUCTION

Over the past decades, a large and controversial increase in Attention Deficit/Hyperactivity Disorder (ADHD) medication use by children has been observed in many studies worldwide. In the United States, an estimated 8.4% of children received stimulant medication in 2016 (Danielson et al., 2018), up from 2.4% in 1996 to 3.5% in 2008. In the UK, the prevalence of ADHD drug use in children under 16 increased 34-fold overall, rising from 0.02% in 1995 to 0.51% in 2008 and then stabilized (Beau-Lejdstrom, Douglas, Evans, & Smeeth, 2016). In Australia, there was an increase of 72.9% in ADHD medication use between 2000 and 2011 (Stephenson, Karanges, & McGregor, 2013). In the Netherlands, the prescription of methylphenidate among children quadrupled between 2003 and 2012, up to nearly 4.5% in 2013 (Health Council of the Netherlands, 2014a), with a small decline of 4% less descriptions and 2% less users in the past few years, but only in younger users (6–15 years old; Stichting Farmaceutische Kengetallen, 2018).

That the increase in medication use is controversial is clearly indicated by steady growth in the number of published scientific studies showing no benefit, running parallel to the rising numbers of children on ADHD medication. This corpus of evidence can be divided into (a) empirical research about the efficacy of medication—sometimes studied in comparison to other interventions—on for example symptom severity or social and school-based outcomes (Jensen et al., 2007; Molina et al., 2009; Riddle et al., 2013; Smith, Jongeling, Hartmann, Russel, & Landau, 2010; Storebø et al., 2015; Swanson et al., 2017) and (b) more general critique of the benefits of medication use (Baughman & Hovey, 2006; Vogt & Lunde, 2018). A number of studies have shown the possible harm and alerted about risks of growth retardation and cardiovascular consequences of these drugs (Castells, Ramos-Quiroga, Bosch, Nogueira, & Casas, 2011; Hennissen et al., 2017; Swanson et al., 2017). Those critical of the rise in ADHD medication typically plea for a more careful approach (Batstra, Nieweg, Pijl, Van Tol, & Hadders-Algra, 2014; Thomas, Mitchell, & Batstra, 2013; Vogt & Lunde, 2018) and for the demedicalisation of attention and behaviour problems[1] in children (Coon, Quinonez, Moyer, & Schroeder, 2014; Frances & Carroll, 2017; Health Council of the Netherlands, 2014b).

Supporting a less medical focus on medication patterns, the Dutch Health Council (Health Council of the Netherlands, 2014a) draws attention to wider social change, such as increased performance pressure, the narrowed bandwidth of what is considered to be "normal" and less and less tolerance for any deviations from the average, as possible reasons for the rise in medication use. Mayes, Bagwell, and Erkulwater (2008) point to the role of education and teachers and indeed some studies have indicated that teachers and other school personnel are often the first to suggest the diagnosis of ADHD in children (Baughman & Hovey, 2006; Sax & Kautz, 2003; Snider, Busch, & Arrowood, 2003). According to Sax and Kautz (2003), the prescription of medication may be partly associated with home/school interactions started by the school. According to some studies, teachers tend to have positive expectations about the effect of stimulant medication on school-related behaviors (Snider et al., 2003), although no ADHD drug has ever been shown to enhance academic performance over the long term (Baughman & Hovey, 2006; Currie, Stabile, & Jones, 2014; Kortekaas-Rijlaarsdam, Luman, Sonuga-Barke, & Oosterlaan, 2018; Langberg & Becker, 2012; Swanson et al., 2017).

In the course of analysing data from a recent study in which we interviewed 30 primary school teachers about their attitude and role in ADHD classifications[2] in pupils (Wienen, Sluiter, Thoutenhoofd, De Jonge, & Batstra,

[1]In line with arguments put forward for demedicalisation, in this manuscript we use the term ADHD alongside the key behaviours indicated through this psychiatric classification: hyperactivity, impulsivity, and inattention. This is because, from the pedagogy-oriented perspective of education, such behavior is at issue wherever it leads to grave interaction problems (e.g., impedes learning). In education, such behavior is then reasonably called unruly. Unruly behaviour most clearly names behaviour that presents a pedagogical challenge for teachers, an interaction break-down that they want or need to do something about: this pedagogy-oriented form of description of those behaviours that psychology terms ADHD is most in keeping with the topic of this manuscript and the teachers that were interviewed

[2]We use the term "classification" rather than the term "diagnosis" throughout, in recognition of the important fact that behaviors that are considered problematic or challenging are above all else a social product and typically without established somatic origin or cause; clear causation being a key definitional attribute of diagnosis. A child with ADHD is recognized as such—also vis à vis the descriptive criteria set for disorders in the Diagnostic and Statistical Manual of Mental Disorders, the DSM—merely in an established conventional sense of sharing a set of characteristics in common with other children showing the same or similar set of characteristics. Note that the classification of individuals' problematic behaviors is thereby strictly speaking a pragmatic matter (nomological and dependent on social and cultural values), rather than a scientific—for example, neurophysiological—matter (essential and dependent only on strictly somatic indicators).

2019), it became clear to us that all respondents spontaneously started to talk about medication when questioned about the ADHD classification. Apparently, for teachers, a classification of ADHD has strongly associated with medical treatment and the school has a large influence in the diagnostic process. It, therefore, seemed important to return to the data once more and gain more insight into teachers' perspectives, being more alert to what exactly they had to say about medication for ADHD. To this end, we carried out further analysis of what teachers had spontaneously said about ADHD medication in our earlier interviews about the role of ADHD classifications in education.

## 2 | METHOD

### 2.1 | Short description of the motive for the present research

In the analysis of a previous study of our research group (Wienen et al., 2019) it turned out that primary school teachers often started talking about medication spontaneously in interviews about ADHD. The current study, therefore, aimed to explore in greater detail what precisely those teachers had said about medication for ADHD, while assuming that what they say about ADHD medication (in the particular) may reasonably be assumed to be indicators of something more general, namely a certain attitude (of teachers) towards ADHD medication. We, therefore, reread all the interviews conducted as part of Wienen et al. (2019) study and in these data brought together all 218 text fragments that mentioned ADHD medication. After the first perusal of our data set of text fragments, we formulated four empirical questions that collectively provide further information about ADHD medication in education and the conceptions of teachers.

**1)** What do teachers say about the role of ADHD medication in education?
**2)** What do teachers say about their attitude to ADHD medication?
**3)** What do teachers say about the effects of ADHD medication?
**4)** What do teachers say about the sources of their knowledge about ADHD medication?

### 2.2 | Data collection

This study is an explorative, post hoc and qualitative reanalysis of existing interview data previously collected by five interviewers under an earlier research project that focused on teachers' ideas about classifying pupils with ADHD (Wienen et al., 2019). For this earlier research project, semi-structured narrative interviews were used, because of both the exploratory character of that study and its objective of capturing respondents' own perspectives in rich detail. From these earlier interviews, we selected for this present study all the text fragments in which teachers had spontaneously talked about ADHD medication; that is, without being prompted by the interviewer.[3]

An inductive or grounded theory approach was used in an attempt to tease out the main themes from the data (Braun & Clarke, 2006; Glaser & Strauss, 1967). A bottom-up thematic analysis of the 218 text fragments tends to involve the structured coding of text data, in a bid to identify patterns of meaning that interviewees attach to the topic matter. In doing so we have assumed that, in principle, there is no compelling reason to suppose that teachers' attitudes towards ADHD medication are particularly distinctive other than by way of clearly professional concern; that is, with teaching pupils. For the whole process, emergent flexibility was necessary (Schreier, 2012) and from there on, identifying notable patterns, in the form of connections that teachers make between ADHD medication

[3]We kindly refer the reader to Wienen et al. (2019) for more information about these interviews and how they were conducted.

and professional concern with teaching and learning. We have assumed that more stable patterns observed in the data reflect more commonplace convictions among the teachers in the sample.

## 2.3 | Participants

The 30 transcripts that were made available to us derived from semi-structured interviews with Dutch teachers (25 women and five men, mean age 44.1 and 34.6, respectively) who were qualified primary school (4–12 years old) teachers recruited via a combination of network sampling (17 respondents), snowball sampling (nine respondents), and approaching several schools in the region via email (four respondents). The average working experience among the teachers in the convenience sample brought together in this way was 16.2 years (range 1–40 years). The teachers in the sample teach year groups 3–7 (6–11 years old) and all had professionally encountered at least one child with a classification ADHD and/or a child with hyperactive, impulsive, and inattentive behavior. All teachers were qualified primary school teachers after graduating the standard education for teachers in the Netherlands on a Bachelors level (PABO). This type of education is focused on students in general, without disabilities. Although different behaviors and several disabilities may be part of the education, this is not necessarily the case and teachers are not specifically trained to teach students with disabilities.

## 2.4 | Data analysis

The interviews were transcribed by five Master's students. For the analysis, paper and pencil and Microsoft Excel were used. Data analysis took place in clear steps.

*Step 1*. The four research questions about ADHD medication resulted from an initial critical reading of our data set of 218 interview fragments about medication for ADHD. Four general themes were found to be recurrent across the sample: the role of ADHD medication for students in the work of teachers, teachers' attitudes towards ADHD medication, effects of ADHD medication and information sources about ADHD medication. Subsequently, the entire data set of interview fragments was coded with these four general themes. The coding involved an iterative process of two coders running independently through the text fragments recursively until all the fragments in the data set were either coded ($N = 216$) or could be excluded from the data set because they proved unrelated to any of the codes that were used ($N = 2$).

*Step 2*. The first and second author then both separately recoded the fragments with the coding scheme, to disambiguate the codes that had been used under the first step (IRR = 40.3%). During the coding process and the analysis of the percentage of agreement, some codes seemed to overlap substantially and one of the researchers often coded more subcodes where the other did not. We, therefore, merged subcodes which appeared to cover the same phenomenon (e.g.,: "ambivalent attitude," "positive but expounded because of disadvantages", and "negative but expounded because of advantages" were merged into one subcode: "ambivalent attitude"), and excluded nonrelevant codes. Furthermore, it turned out that not all codes were clear to both researchers. The researchers discussed their interpretation of codes that proved ambiguous and this led to some codes being renegotiated and more clearly defined. The final coding scheme consisted of 17 subcodes (three for theme 1, four for theme 2, three for theme 3, and seven for theme 4), with 204 coded fragments. Fourteen fragments were excluded from the data set because they were unrelated to the new coding scheme. Then both researchers coded all fragments again. In cases where fragments matched with more than one code, the one that best fitted the fragment according to both researchers was chosen. In some cases, two or three codes were applied simultaneously to one and the same fragment.

**TABLE 1** Coding scheme

| Theme | Subcode | Description |
|---|---|---|
| Role medication in education | | Casualness/experience medication for ADHD in education |
| | Experience | Experience with medication for ADHD in the classroom: teacher has (never; had) experience with the student with medication (student actually took medication or literally no student with medication) |
| | Direct association | Direct association ADHD −>medication (+ diagnosis necessary for medication) |
| | Role organization | Teacher plays a role in the organization/distribution of medication |
| Attitude towards medication | | Attitude towards medication (a general attitude) |
| | Positive attitude | General positive attitude towards medication |
| | Ambivalent attitude | Ambivalent attitude (weighing two evils without explanation is ambivalent); positive but expounded because of disadvantages + negative but expounded because of advantages |
| | Negative attitude | General negative attitude towards medication |
| | Fear | Fear of medication |
| Effects of medication | | Effects of medication (this is about visible effects) |
| | Positive effect | The visible positive effect for child/person, or heard about it (f.e. child/parent saying that he is experiencing a specific positive effect) |
| | Negative effect | The visible negative effect for child/person, or heard about it (f.e. child/parent saying that he is experiencing a specific negative effect) |
| | No effect | Medication had no effect according to teacher |
| Source knowledge/opinion | | Where obtain knowledge/what do they base an opinion on |
| | Medicated person | From a child/person with medication |
| | Parent | From the parents of a child with medication |
| | Own experiences | Own experiences: what the teacher perceives by himself |
| | Media | From the media |
| | Professional/specialist | From a professional/specialist |
| | Colleague | From a colleague |
| | Not enough knowledge | Mentions he does not have enough knowledge |

Following this process of code disambiguation, inter-rater reliability of the resulting codes proved good (IRR = 70.0%). A closer look into disagreement among the researchers showed not a significantly different interpretation of the fragment, but a different idea of the best fitting code. Quotes containing coding disagreement among the researchers were avoided as much as possible for citation in the findings. The coding scheme of four themes and their disambiguated subcodes is given in Table 1 (samples of coded text can be found in the findings).

*Step 3*. Step 3 concerned identifying and reporting main patterns in what the teachers had said in their interviews while talking about ADHD medication and searching the codes for evidence for apparent experiences or opinions that the teachers have about ADHD medication, given a professional concern with teaching and learning. This step essentially involves interpretation—for example, treating what one person said as comparable in intention, or not, to what another person said. That data interpretation is reported in the next section.

Before writing the present text, a native bilingual speaker of English and Dutch checked the translations of the quotes that are used in this article, to make sure that the translations resemble the language that was used by the respondents, with a focus on intended meaning rather than the proximity of words in literal translation. In what follows, each respondent is represented by a number. After every citation, the corresponding respondent number is given between brackets. The original Dutch quotes are available on request from the first author.

## 3 | RESULTS

In what follows, the information that was retrieved from the interviews will be discussed per theme.

### 3.1 | The role of ADHD medication for students in the work of teachers

Almost all teachers spontaneously start to talk about medication. Only two teachers in our sample do not have experience with pupils on ADHD medication: "I don't know any regular continual medication users." (1) and "I have never had a box of Ritalin in my drawer." (16). All other teachers have (had) pupils on ADHD medication. Most teachers mention examples of students on medication: "this boy does get it. But that was already the case before he was in my class. Another boy too, but he didn't come to anything." (19) or "at least two of them are diagnosed and on medication." (23). For one teacher ADHD medication seems a kind of threshold indicator for the condition itself: "I have never had any children in my classroom with an ADHD diagnosis who did nót take medication." (6).

In line with the previous citation, many teachers directly link a classification ADHD to pharmaceutical treatment, already after one of the first interview questions: What do you think of when I say, "ADHD?": "ADHD. Yes. Then I think, now the pills are coming." (2). ADHD and medication often seem inseparable to teachers: "Because the next decision, of course, is medication yes or no." (12). The link between a classification ADHD and medication is also made in another way, namely by establishing that a classification is a prerequisite for receiving medication. In response to the question of why ADHD continues to be a sought-after classification, one teacher answers: "well I, I think especially because you can give medication then. I think that's it, for me that's it." (20) and another teacher answers in response to the question whether the school may have an interest in ADHD diagnoses: "well, yes perhaps if you believe that uhm medication might help, because you cannot give medication if there is no diagnosis." (19).

Teachers sometimes also play an active role in medication use, like monitoring or thinking along, or in administering the medication. This can be via active collaborating with parents and children: "For example, a boy who needed his medication, well every time at half past 11 he came to me to take his medication." (27). Teachers also negotiate medication being taken at particular times: "It did happen that someone had medication at a particular time that was just not really convenient. Together we discussed whether it would be possible for him to take the medication a little later at home so that he could take it a bit later at school, because that was a bit easier." (18).

### 3.2 | Attitudes towards ADHD medication

The respondents hold different attitudes towards medication for ADHD, from negative to positive and different gradations in between. The data were coded for affect on fragment level and not on teacher level. After all, a teacher with a generally positive attitude towards medication can also make statements indicative of a more negative attitude and vice versa.

Most teachers make nuanced statements or seem to have an ambivalent attitude: "Yes, in some cases it is just really necessary. […] No, not always. I don't just think 'Oh he has a diagnosis of ADHD, he should get a pill.' No, absolutely not. That is different for every child. But, yes, if a child really doesn't sleep at all by night, or cannot find

peace at all, yes. At a certain moment it is necessary." (14), "Yes medicines, they are eh, (laughs) shit for most people. […] Uhm, as a parent I can understand the reaction. As a teacher I prefer a continual use." (15) and "If there is a diagnosis, then the conversation is more about how is it at this moment. And, if there is medication, does it help or is it useless and could we, perhaps, first try it without medication or do they like to try it at first or something." (18). The negative statements about medication are often more nuanced than the positive statements.

Some teachers make distinct statements about medication for ADHD, with more explicitly positive than explicitly negative statements, like "In the first place I think, I am really happy with medication because you can really help a child with medication." (8) versus "Yes and especially also to, because I am not a supporter of medication at all, so if at school I… as with that boy now, too. Well, I have no idea why he should perhaps get medication in a while." (14).

Next to more or less positive or negative fragments, there are also two teachers who mention fear of medication; for example: "Yes and the fear of those medicines, whether any research has been done at all, on the effects. And in the long term…" (12).

## 3.3 | Effects of ADHD medication

The respondents report mainly positive effects of medication. These positive effects mostly imply effects for the child itself: "They can focus better. They can control their thoughts better. They are more in control of themselves." (8). In addition, positive effects on the child's environment are mentioned. The environment can include parents, the class or teachers: "Yes, but well the parents eventually too, it gave them a bit of peace." (19). Another example contains a summary given by an interviewer (I) to which the teacher (R) responds in the affirmative: "I: Okay and you just said, if the class also suffers, do you notice that when a child is on medication it has an effect on the class? R: Yes. I: Okay and it gives more peace in the class? R: Yes.." (15).

Only a few teachers mention negative effects for ADHD medication, mostly about behavioural/emotional change or problems with eating and sleeping: "There is another reason why parents don't want assessment and also no medication; because they are afraid that their child will flatten emotionally. That's what they're afraid of." (8) or "Then it was decided that he should go on medication and, uhm, that has a lot of consequences now, because it has a lot of adverse effects, on appetite and sleeping and so on." (20).

Some teachers report cases in which medication had no effect whatsoever: "Then he had for a while, I believe Ritalin, well that didn't work for him at all." (6) and "It doesn't work for everybody. For the boy I now have, for example. With very severe ADHD, yes those pills do not help." (15).

## 3.4 | Information sources about ADHD medication

Teachers get their knowledge about ADHD medication from a range of sources. Sometimes teachers tell about medication from the view of the child/person using medication itself or form their opinion based on statements from the children with medication themselves: "that was also what the girl was saying this morning: 'when I take my medication I can concentrate better, then I can keep on working, then I have fewer arguments. Uhm, then I feel happy.'" (21) or "And they say: 'yes, if I do not take my pill then it is a big chaos and when I do take it then I can work better.' Then I think, okay, that is the advantage of medication and then you should do it, I think." (26).

Relative to teachers recounting knowledge gained from children themselves, a greater number of teachers discuss information about ADHD medication gained from the parents of medicated pupils. Examples are: "I now for example have a child with ADD, without the H. But uhm, those parents are very happy with the diagnosis. Like: now we know, what it is. But they are very wary of medication. Like: what do we put into our son's body. Yes and I can imagine that. So then you are searching with parents for what does help, how can we best help your child?" (17) or "I also know parents who say that, at school, we use medication for the learning process, but not at home. They don't mind if their child is hyperactive at home, that is okay." (19).

By far most of the teachers talk about medication in terms of reference that are based on their own experience and their own observations of pupils who are taking it: "Purely and simply because he did receive the right medication then. That you also saw that he became more restful […] They once tried to cut back on the medication. Therefore he first had to be totally clean, so uhm, totally phasing out and then start again. I saw him seriously declining in two, 3 weeks, yes, he was almost unhappy. Then I thought, guys, is this necessary, things were going fine." (6) or "Because at first I was not a supporter of medication either, but now that I've seen the effects for many children, how it helps, I am a supporter of at least trying it." (8).

Some teachers gain knowledge from what the media say about ADHD and medication: "You often hear uh, well then TV-programs are looking for children who changed completely after Ritalin use, so who were diagnosed too early and then they stop and they get their child back." (1) and "Well, you know, also in the media, ooh Ritalin, don't do it because your child changes and this and that and that. And the other says yes, but a child with this you also give that, you know. And, as a parent, I also experienced that as hard." (5). Specialists and colleagues are hardly mentioned as a source of information.

A few teachers note that they do not have enough knowledge to make decisions about medication or form an opinion on it. Some further admit to not having enough knowledge about (adverse) effects and long-term effects: "Yes if I ever meet a Ritalin user I would like to have knowledge about it. What does it do exactly and what could it help with. That's what I'm constantly looking for. What is their need and what role does medication play in that need? Does it really help or is it just suppressing that the child is hyperactive? What my interpretation is, which perhaps isn't right at all. But yes, I have that feeling about it. But well, that's the ignorance of me." (1).

## 4 | DISCUSSION

### 4.1 | Principal findings

This study has explored what 30 Dutch primary school teachers spontaneously say about medication for ADHD during interviews about ADHD. Many of the teachers link ADHD to medication. They sometimes even make this association immediately or talk about ADHD and medication as if inseparable, two sides of a single coin. In some cases, they are actively involved in the process of distributing medication. Furthermore, while the teachers' talk seems overall ambivalent towards medication, individual respondents mainly report positive effects of it. Finally, the teachers' talk suggests that they access many different sources for their knowledge about medication, including their own experiences, others' experiences and media. In none of the interview fragments learning about ADHD, or ADHD study, or information materials are mentioned; nor did any of the teachers refer to research on ADHD medication.

### 4.2 | Discussion

Almost all of the teachers that were interviewed had experience with children on ADHD medication and often a direct link between ADHD and medication was mentioned. It is worth alerting to this ready association of ADHD with medication, as opposed to nonmedical treatment. Danielson et al. (2018) reported that medication is still the most used treatment for ADHD (62.0% of children with ADHD), pointing out that more than half of the children with ADHD do not receive behavioral treatment. Vereb and DiPerna (2004) describe a lack of knowledge about alternative treatments. The current study confirms such findings with respect to the apparent experience among teachers: among those included in this study, hardly any among them had pupils with ADHD but without medication.

Furthermore, although the overall attitude towards ADHD medication seems to be ambivalent among the teachers, in the interview fragments mainly positive effects of ADHD medication are mentioned. In the interview fragments meanwhile, teachers most often talk about ADHD medication as part of their own classroom

experiences. In classrooms, students are expected to be attentive and calm and to demonstrate self-control (Bell, Long, Garvan, & Bussing, 2011). In the short term, medication effectuates behaviors that are of benefit in educational settings: compliant and task-oriented behaviors. However, ADHD medication has never shown to enhance academic performance over the long term (Kortekaas-Rijlaarsdam et al., 2018). Waschbusch, Pelham, Waxmonsky, and Johnston (2009) report that there may be significant placebo effects in adults who evaluate children with ADHD on stimulant medication. Teachers may change their behavior when they know a student is on medication; the positive attitude towards medication may develop into a more positive attitude towards the student, which may break the negative spiral. The negative effects of medication, like decreased appetite, weight loss and abdominal pain (Holmskov et al., 2017) in the short term and cardiovascular risks (Hennissen et al., 2017) and growth retardation (Swanson et al., 2017) in the long term, may often not be discerned by the teacher, which may result in a biased view. So most teachers are ambivalent; they feel to some extent that medication is not always good, but simultaneously they primarily experience positive effects. These experienced positive and short term effects might be one of the reasons that schools often initiate diagnostic processes. It may be wise to make knowledge about negative short and long term effects of ADHD medication readily available to teachers seeking further professional learning.

It is remarkable that our collection of interview fragments of teachers' talking about ADHD medication mainly suggests them accessing their own experiences and others' experiences and not learning about ADHD, or ADHD study, information materials or research on ADHD medication, which was for example found in a study by Snider et al. (2003), in which teachers often reported in-service training as their source for knowledge and never mentioned their own experiences. This may be a consequence of the fact that the teachers in the study of Snider et al. (2003) were asked explicitly what sources they relied on for information about ADHD, while in the present study this information was deduced implicitly from teachers discussing their experience with ADHD pupils in more general terms.

Professional development training is an effective way for teachers to receive a more balanced diet of reliable and up to date information about ADHD as well as about the advantages and disadvantages of both ADHD medication and nonmedicinal responses, so that teachers are better supported in making evidence-based pedagogical judgments. However, it may be seriously doubted that professional development is fulfilling this important role at present. This may be due to the gap between theory and practice. It is well known that scientists do often not succeed in transferring their knowledge (in this case about ADHD medication) to professionals who work practically with children. Furthermore, positive initial results of medication received a substantial amount of attention, the significant adverse and controversial results of follow-up studies did not (Nieweg, 2010). This phenomenon is not exceptional. Also in other fields, such as depression and anxiety, reporting, publication, and citation bias have been shown (Bastiaansen, De Vries, & Munafò, 2015; De Vries, Roest, Beijers, Turner & de Jonge, 2016; De Vries, Roest, Franzen, Munafò, & Bastiaansen, 2016; De Vries, Roest, Turner, & De Jonge, 2018; Roest et al., 2015). In short, positive results receive more attention than controversial and negative results. Hence, people do not always get access to well-balanced, reliable and up to date information, and also study books are often biased (Freedman, 2015; Moldavsky & Sayal, 2013; Te Meerman, Batstra, Hoekstra & Grietens, 2017b). The gap between theory and practice will be maintained and teachers are often not in the position to make evidence-based pedagogical judgments. Furthermore, a biomedical perspective on ADHD remains ever dominant in education and disempowers teachers and their pedagogical expertise; as long as teachers themselves continue to prioritize medication in overcoming behavior and so take a positive attitude towards ADHD medication, they are probably less inclined to consider their own performance and their role as key to addressing adverse behavior (Te Meerman, Batstra, Grietens, & Frances, 2017a).

## 4.3 | Limitations and implications

This study has some limitations. First, the teachers did know the topic of the interview, their perceptions of children with hyperactive and unruly behavior, in advance. It may have been possible that teachers with a specific and

explicit opinion decided to participate or on the contrary abandoned participation. This study only contained teachers from the North of the Netherlands. It is likely that this regional sample is in various ways not representative of teachers in the Netherlands overall. Due to this and due to the relatively small sample size, it is not possible to unthinkingly generalize the results of this study. Furthermore, except for all teachers being qualified after having gained the sort of professional training that is standard for teachers in the Netherlands, no effort was made to collect further information from them about additional professional training, or specific training related to teaching students with disabilities. However, analyses of study books showed bias and there is no particular reason to assume that teacher professionalization courses or programs escape such bias (Moldavsky & Sayal, 2013; Te Meerman, Batstra, Hoekstra & Grietens, 2017b). Finally, although the interviewer never initiated talk about medication, elicitation strategies likely differed between the interviewers, including to what extent they stimulated (possibly nonverbal or unconsciously) the teacher to continue talking about medication.

Taking into account these limitations, we can list the following implications. The findings from this study suggest that teachers should be better educated in relation to ADHD, ADHD medication and its effects on the short and long term and be more knowledgeable about alternative approaches and interventions for hyperactive and unruly behavior, especially those that are directly relevant to pedagogy. This training should be based on scientific evidence that adequately reflects scholarly agreements and disagreements on the topic. Such training could surely be included in teacher training, as well in professional development programs or other in-service training for teachers. While according to the teachers that were part of this study, medication for ADHD appears to have some positive effects and advantages in the short term (with pupils seeming more on task and showing less disturbing behavior in the classroom), the teachers seemed much less aware of negative effects of medication, while such is now more extensively reported in the research literature. If teachers are made aware of these negative effects and of effective alternatives to achieve the goals and know how to administer them, they may be more inclined to consider what optimal balance may be obtained between medical and nonmedical, perhaps also more pedagogical, alternatives to medication (see for an overview Veenman, Luman, & Oosterlaan, 2018).

This study reported on teachers who were found to have an ambivalent attitude towards medication and some even a fear of medication. It was found that teachers report sometimes being actively involved in the process of distributing medication to children. Since medication used with hyperactive behavior can have serious repercussions on persons' health in the long term, teachers distributing medication among pupils is also an ethical issue. This moreover becomes troubling in particular where this behavior is based on partial knowledge that teachers have about the consequences of ADHD medication—that is, in most cases. Future research might investigate what the effects of knowledge about negative consequences of medication are on the role and attitudes of teachers who administered these pills to children.

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